

Practice % Concentration

%C(m/m)

1. You are given 150 grams of a 5% acid solution.

a) What is the mass of acid in this solution?

$$i. \%C(m/m) = \frac{m \text{ of solute}}{m \text{ of solution}} \times 100\%$$

$$ii. 5\% (m/m) = \frac{?}{150g} \times 100\%$$

$$iii. \frac{5g}{100g} = \frac{?}{150g} \times \frac{100\%}{100\%}$$

$$iv. ? = \frac{5g \times 150g}{100g}$$

b) What is the mass of water in this solution?

$$v. \text{ mass of acid} = \boxed{7.5g}$$

$$m \text{ of solution} = m \text{ of solute} + m \text{ of solvent}$$

$$150g = 7.5g + \text{mass of water}$$

$$\text{mass of water} = 150g - 7.5g = \boxed{142.5g}$$

2. A 720g solution of salt contains 25 g of salt.

a) What is the percent mass concentration?

$$i. \%C(m/m) = \frac{m \text{ of solute}}{m \text{ of solution}} \times 100\%$$

$$ii. \%C(m/m) = \frac{25g}{720g} \times 100\%$$

$$iii. \%C(m/m) = \boxed{3.47\%}$$

b) What is the mass of the water?

$$m \text{ of solution} = m \text{ of solute} + m \text{ of solvent}$$

$$720g = 25g + ?$$

$$? = 720g - 25g = \boxed{695g}$$

3. You have 50 g of an acid and are making a 15% acid solution.

a) What is the mass of the solution?

$$i. \%C(m/m) = \frac{m \text{ of solute}}{m \text{ of solution}} \times 100\%$$

$$ii. 15\% = \frac{50g}{?} \times 100\%$$

$$iii. \frac{15g}{100g} = \frac{50g}{?} \times \frac{100\%}{100\%}$$

$$iv. ? = \frac{100g \times 50g}{15g}$$

$$v. \text{ mass of solution} = \boxed{333.\bar{3}g}$$

b) What is the mass of the water needed to make this solution?

$$m \text{ of solution} = m \text{ of solute} + m \text{ of solvent}$$

$$333.3g = 50g + ?$$

$$? = 333.3g - 50g$$

$$? = \boxed{283.3g}$$

%C(v/v)

4. You dissolve 15 mL of honey in 250 mL of water.

a) What is the percent volume concentration?

$$\begin{aligned}\%C(v/v) &= \frac{V \text{ of solute}}{V \text{ of solution}} \times 100\% \\ &= \frac{15 \text{ mL}}{265 \text{ mL}} \times 100\% \\ &= \boxed{5.66\%}\end{aligned}$$

b) What is the volume of the solution?

$$\begin{aligned}V \text{ of solution} &= V \text{ of solute} + V \text{ of solvent} \\ &= 15 \text{ mL} + 250 \text{ mL} = \boxed{265 \text{ mL}}\end{aligned}$$

5. You want to make 80 mL of a 15% solution of acid.

a) What is the volume of the acid?

$$\text{i. } \%C(v/v) = \frac{V \text{ of solute}}{V \text{ of solution}} \times 100\%$$

$$\text{ii. } 15\% = \frac{?}{80 \text{ mL}} \times 100\%$$

$$\text{iii. } \frac{15 \text{ mL}}{100 \text{ mL}} = \frac{?}{80 \text{ mL}} \times \frac{100\%}{100\%}$$

$$\text{iv. } ? = \frac{15 \text{ mL} \times 80 \text{ mL}}{100 \text{ mL}}$$

$$\text{v. volume of acid} = \boxed{12 \text{ mL}}$$

b) What is the volume of the solution?

80 mL

6. You have dissolved 20 mL of solute to make a solution with a percent volume concentration of 2%.

a) What is the volume of the solution?

$$\text{i. } \%C(v/v) = \frac{V \text{ of solute}}{V \text{ of solution}} \times 100\%$$

$$\text{ii. } 2\% = \frac{20 \text{ mL}}{?} \times 100\%$$

$$\text{iii. } \frac{2 \text{ mL}}{100 \text{ mL}} = \frac{20 \text{ mL}}{?} \times \frac{100\%}{100\%}$$

$$\text{iv. } ? = \frac{100 \text{ mL} \times 20 \text{ mL}}{2 \text{ mL}}$$

$$\text{v. volume of solution} = \boxed{1000 \text{ mL}}$$

b) What is the volume of solvent?

$$V \text{ of solution} = V \text{ of solute} + V \text{ of solvent}$$

$$1000 \text{ mL} = 20 \text{ mL} + ?$$

$$? = 1000 \text{ mL} - 20 \text{ mL}$$

$$\begin{aligned}\text{Volume of solvent} &= \boxed{980 \text{ mL}}\end{aligned}$$

%C(m/v)

8. You want to make 100mL of a 6% solution.

What is the mass of the solute?

i. $\%C(m/v) = \frac{\text{mass of solute}}{\text{volume of solution}} \times 100\%$

ii. $6\% = \frac{?}{100\text{mL}} \times 100\%$

iii. $\frac{6\text{g}}{100\text{mL}} = \frac{?}{100\text{mL}} \times \frac{100\%}{100\%}$

iv. $? = \frac{6\text{g} \times 100\text{mL}}{100\text{mL}}$

v. mass of solute = $\boxed{6\text{g}}$

9. You have 680g of a solute in 2222mL of water.

What is the percent concentration of the solution?

$$\%C(m/v) = \frac{m \text{ of solute}}{V \text{ of solution}} \times 100\%$$

$$\%C(m/v) = \frac{680\text{g}}{2222\text{mL}} \times 100\%$$

$$\%C(m/v) = \boxed{30.6\% (g/mL)}$$

10. You have 5g of solute to make a 10% m/V solution.

What is the volume of the solution?

i. $\%C(m/v) = \frac{m \text{ of solute}}{V \text{ of solution}} \times 100\%$

ii. $10\%(m/v) = \frac{5\text{g}}{?} \times 100\%$

iii. $\frac{10\%}{100\text{mL}} = \frac{5\text{g}}{?} \times \frac{100\%}{100\%}$

v. volume of solution = $\boxed{50\text{g}}$

iv. $? = \frac{100\text{mL} \times 5\text{g}}{10\%}$

Mix % C

11. What volume of solute is need to make 300 mL of a 15% solution of peroxide?

$$i. \% C (V/V) = \frac{V \text{ of solute}}{V \text{ of solution}} \times 100\%$$

$$ii. 15\% = \frac{?}{300\text{mL}} \times 100\%$$

$$iii. \frac{15\text{mL}}{100\text{mL}} = \frac{?}{300\text{mL}} \times \frac{100\%}{100\%}$$

$$iv. ? = \frac{300\text{mL} \times 15\%}{100\%}$$

$$v. \text{ volume of solute} = \boxed{45\text{mL}}$$

12. What is the concentration by % (m/v) if 67 g are dissolved to make 1.2 L of solution?

$$\% C (m/v) = \frac{m \text{ of solute}}{V \text{ of solution}} \times 100\%$$

$$= \frac{67\text{g}}{1200\text{mL}} \times 100\%$$

$$= \boxed{5.58\% (g/mL)}$$

13. You need to make a 540 g of a 5% acid solution.

a. What is the mass of the acid in the solution?

b. What is the mass of the solvent?

$$a. i. \% C (m/m) = \frac{m \text{ of solute}}{m \text{ of solution}} \times 100\%$$

$$ii. 5\% = \frac{?}{540\text{g}} \times 100\%$$

$$iii. \frac{5\text{g}}{100\text{g}} = \frac{?}{540\text{g}} \times \frac{100\%}{100\%}$$

$$iv. ? = \frac{540\text{g} \times 5\%}{100\%}$$

$$v. \text{ mass of acid} = \boxed{27\text{g}}$$

$$b. m \text{ of solution} = m \text{ of solute} + m \text{ of solvent}$$

$$540\text{g} = 27\text{g} + ?$$

$$m \text{ of solvent} = 540\text{g} - 27\text{g} = \boxed{513\text{g}}$$

14. If 162.35 g aluminum hydroxide are dissolved in 6750 mL of solution, what is the concentration of the solution?

$$C = \frac{m}{V}$$

$$C = \frac{162.35\text{g}}{6750\text{mL}}$$

$$C = \boxed{0.0241\text{g/mL}}$$

$$\text{or } C = \frac{162.35\text{g}}{6.75\text{L}}$$

$$C = \boxed{24.1\text{g/L}}$$